

## CLAIMS:

1. A method of reconstructing an MR image (14) from MR signals (1, 2, 3, 4) that are acquired in parallel by a plurality of receiving coils (5, 6, 7, 8) with incomplete sampling of the spatial frequency space, the reconstructed MR image (14) being calculated iteratively as the solution of a system of linear equations, characterized in that the iteration process (15) begins with a starting image (9) which approximates to the MR image to be reconstructed (14), in such a way that undersampling artifacts are suppressed in the intermediate solutions of the system of linear equations that are obtained during the course of the iteration process (15).
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- 10 2. A method as claimed in claim 1, characterized in that the starting image (9) is generated by reconstructing restricted sub-regions (10, 11, 12, 13) of the starting image (9) from those MR signals (1, 2, 3, 4) that are acquired by receiving coils (5, 6, 7, 8) that have high respective sensitivities in these sub-regions.
- 15 3. A method as claimed in claim 2, characterized in that, in those sub-regions (16) of the starting image (9) that cannot be reconstructed directly from MR signals (1, 2, 3, 4) acquired by individual receiving coils (5, 6, 7, 8) owing to the degree of undersampling, the missing image information is synthesized from the MR signals in their entirety.
- 20 4. A method as claimed in claim 1, characterized in that the starting image is reconstructed from the MR signals at a resolution that is reduced in comparison with the definitive MR image.
- 25 5. A method as claimed in claim 1, characterized in that what is used as the starting image is an MR image that has already been reconstructed and that is similar to the MR image that has yet to be reconstructed.
6. A method as claimed in claim 5, characterized in that, in the reconstruction of a plurality of MR slice images, the starting image is generated from at least one MR image

that has already been reconstructed and that has an image plane adjacent to the MR image that has yet to be reconstructed.

7. A method as claimed in claim 5, characterized in that, in reconstructing a series of MR images spread over time, what is used as a starting image is an MR image that has already been reconstructed and that was acquired at a time prior to the MR image that has yet to be reconstructed.

8. A method as claimed in any of the foregoing claims, characterized in that, in the acquisition of the MR signals (1, 2, 3, 4), the sampling of the spatial frequency space takes place radially or spirally or in any other non-Cartesian fashion.

9. An MR apparatus having a main field coil (17) for generating a homogeneous static magnetic field in an examination volume, a plurality of gradient coils (19, 20, 21) for generating magnetic field gradients in the examination volume, at least one emitting coil (24) for generating high-frequency fields in the examination volume, a plurality of receiving coils (25, 26, 27) for the parallel acquisition of MR signals from the examination volume, and a central control unit (22) for operating the gradient coils (19, 20, 21) and the emitting coil (24), plus a reconstruction and display unit (30) for processing and showing the MR signals, characterized in that the reconstruction and display unit (30) has a programmed control means that operates by the method claimed in any of claims 1 to 8.

10. A computer program for an MR apparatus as claimed in claim 9, characterized in that a method as claimed in any of claims 1 to 7 is implemented on the reconstruction and display unit of the MR apparatus by the computer program.